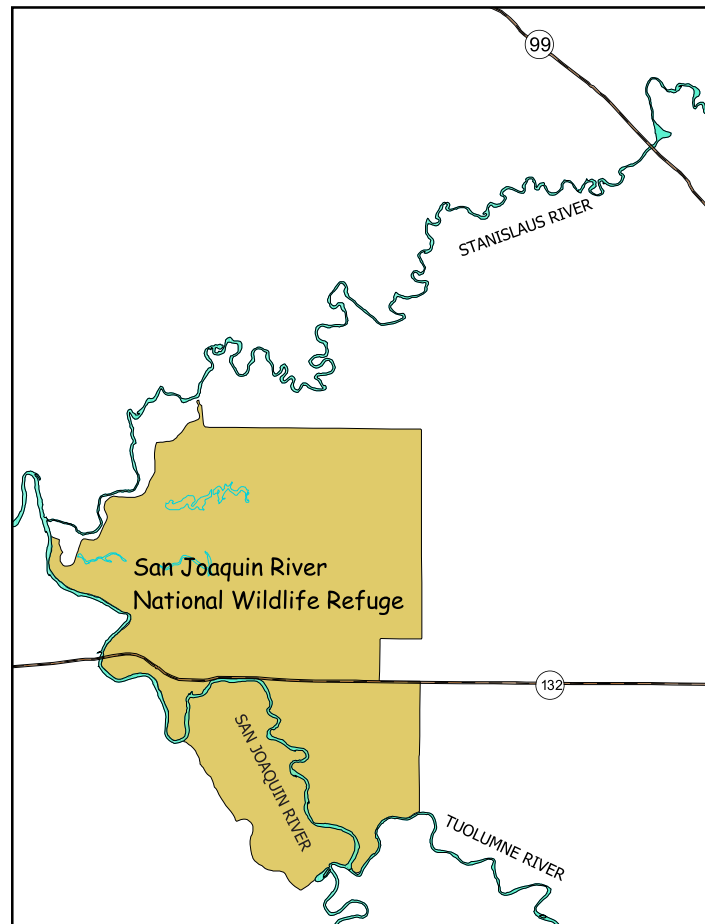


San Joaquin National Wildlife Refuge

Expansion of the San Joaquin National Wildlife Refuge is a good example of the partnerships and multiple benefits CALFED seeks to achieve. Expansion of the refuge will reduce flooding, protect and restore valuable wildlife habitat and provide other local benefits.

The San Joaquin National Wildlife Refuge is located in the heart of the San Joaquin Valley and includes portions of the natural floodplain for the San Joaquin, Stanislaus and Tuolumne Rivers. The San Joaquin Valley is an important contributor to California's agricultural wealth and prosperity. The conversion of wetlands to farmlands has changed the landscape by diminishing the valley's wetland and riparian habitats and the species dependent on those habitats. What remains of the river ecosystem is vitally important to existing wildlife populations.

In 1997, devastating floods swept through the San Joaquin Valley causing loss of life and an estimated \$2 billion in property damage. The San Joaquin River broke



through its leveed banks, inundated urban areas and flooded vast areas of farmland. As a result, Federal and State agencies are developing nonstructural flood control strategies, which include expansion of the San Joaquin National Wildlife Refuge and protection of riparian and wetland habitats.

More than \$10.5 million of Federal Bay-Delta Act funds have been provided through CALFED for expansion of the San Joaquin National Wildlife Refuge. The benefits provided by this project include widening of the floodplain, increased residence time and transient storage of flood waters, groundwater recharge and the protection and restoration of important riparian and wetland habitats.

Yolo Bypass - Habitat Restoration Compatible with Flood Management

The Yolo Bypass and North Delta present tremendous opportunities for reducing flood damage and achieving restoration of areas important to at-risk species.

The Yolo Bypass is a managed floodway which floods approximately every third year, conveying 80 percent of the inflow from the Sacramento River basin during high water. Flooding of the Yolo Bypass creates 59,000 acres of shallow water habitat, approximately doubling the wetted area of the Bay-Delta. Although the Bypass' primary function is flood management, there are significant benefits to native fish and wildlife.

The Yolo Bypass supports at least 40 different species of fish, including Delta smelt, steelhead trout, sturgeon and winter-run chinook salmon. Scientists believe that access to flooded areas in the Bypass gives native fish a competitive edge over exotic species. For example, the Bypass appears to be particularly valuable habitat for the recently listed Sacramento splittail, providing spawning, rearing and foraging habitat. Similarly, the Bypass is important for rearing of young chinook salmon which grow faster on the floodplain because of warm temperatures and an abundant food supply. In addition, the Bypass has proven to be an important link in nutrient cycling and in the Bay-Delta

foodchain.

The proposed North Delta National Wildlife Refuge is located about 10 miles west of Walnut Grove in the southern end of the Yolo Bypass. The area under consideration includes three flood prone Delta islands: Prospect Island, Liberty Island and Little Holland Tract. CALFED has approved more than \$5 million toward the restoration of Prospect Island, which is currently in public ownership, and has approved almost \$9 million for the acquisition of Liberty Island. Preservation and restoration of these islands will provide important values for fish and wildlife species and substantially improve the conveyance of floodwaters through the North Delta.





Watersheds - Ecosystem Restoration at the Grass Roots Level

The physical form of the Bay-Delta is affected by the biological components of its tributary watersheds. Effective management of those lands to sustain high levels of productivity for all resources is complex and critical to the success of the CALFED Program.

The watershed of the Bay-Delta system is comprised of many tributary watersheds, each with still further division into smaller tributary watersheds. Funding watershed activities provides biological benefits and the opportunity to involve local communities and organizations in the decision making and implementation of the CALFED Program. Local involvement and support is a fundamental component of the long-term success of ecosystem restoration activities. Engaging and coordinating with local communities helps define restoration activities which are best able to achieve CALFED goals and are most likely to be successfully implemented. Coordinating with local in-

terests and approaching restoration from a grass roots level enhances long-term sustainability of restoration actions and provides opportunities for local benefits.

Many local watershed programs are in their formative stages. Those that are established may lack the resources or information in specific areas to function efficiently. Consistent with the objectives defined in the CALFED Watershed Program, more than \$5.5 million has been approved for 27 projects to provide support to local watershed organizations and implement watershed actions which will benefit the Bay-Delta.

Environmental Water Quality

An estimated 5,000-40,000 tons of contaminants enter the Bay-Delta annually. Researchers frequently discover that water and sediments in various parts of the Bay-Delta ecosystem are toxic to fish and invertebrates and present a risk to human health.

Contaminants are present in varying degrees in the water and sediments of aquatic habitats in many areas of California. Poor water quality affects ecological habitats and species important to the Bay-Delta. Scientists have determined that contaminants can adversely affect the aquatic foodwebs, and fish and wildlife populations in the Bay-Delta ecosystem.

Water quality conditions which have the potential to adversely affect the Bay-Delta ecosystem include low levels of dissolved oxygen that block upstream migration of anadromous fish and reduce the survival of other aquatic organisms; bioaccumulation of

selenium, which can be highly toxic to fish and wildlife at relatively low concentrations; residual mercury used during California's gold mining era; salinity, which can cause local and seasonal environmental impacts to fish; unknown sources of toxicity that cause both toxic effects and mortality to aquatic life; and pesticide loads from agricultural runoff which have the potential to impair aquatic life.

How future restoration sites are managed has the potential to affect water quality. It is unclear whether the restoration of wetlands and floodplains can contribute to the degradation of drinking water quality. Ecosystem restoration activities, which maximize



water quality benefits to habitats and species while not adversely impacting other uses such as drinking water, are an important part of the CALFED Program. More than \$21 million has been approved for 26 projects intended to answer important water quality questions and implement actions that achieve restoration goals and improve water quality for the Bay-Delta system.

Invasive and Non-Native Species

Invasive and non-native species are one of the greatest threats to restoration efforts for the Bay-Delta. It is estimated that a new non-native species is identified in the Bay-Delta every 15 weeks.

Invasive and non-native species have had a significant impact throughout the Bay-Delta ecosystem. Non-native species make up an increasing proportion of the zooplankton, fish species and aquatic plant communities in the Bay-Delta. Research has shown that a large number of non-native species dominate some Bay-Delta habitats in number of species, number of individuals, biomass, and rate of invasion. It is unclear which species are affecting the Bay-Delta, exactly how they are affecting the Bay-Delta ecology and to what extent they can be eradicated or controlled.

It is critically important to reduce the number of new non-native species introduced into the Bay-Delta. It is also important that we understand how existing non-native species function in the Bay-Delta ecosystem and how non-native species will influence future restoration efforts.

With funding support of CALFED, the U.S. Fish and Wildlife Service is leading a Non-Native Invasive Species Work Team to develop, implement, manage, and coordi-



nate a non-native species program for CALFED. The objectives of the program are to develop a long-term Strategic Plan and Implementation Plan, now in draft, and to manage non-native invasive species in the Bay-Delta estuary and its watersheds. The program will support projects to prevent or minimize additional invasive species from being introduced, and control-oriented management and research projects to eradicate or manage invasive species once they have arrived.

